Space Weather Forecast

Issued on Saturday, 23 July 2022 at 01:26 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Earth-directed Coronal Mass Ejection (CME) expected early 23 July. G1/Minor Storms expected with G2/Moderate storms likely. Slight chance of Moderate flares (R1-R2 Radio blackouts) throughout.

Analysis of Space Weather Activity over past 24 hours
Solar Activity: Solar activity has been Low over the last 24 hours, with only modest C-class flare activity. There are seven sunspot regions on the visible disc, but none of these evolved significantly in appearance or magnetic complexity. In addition to the forecast CME (coronal mass ejection), two further CMEs have been observed leaving the western side of the Sun and will be analysed when further imagery becomes available, for a potential Earth-directed component.

Solar Wind / Geomagnetic Activity: The earth came under the influence of a fast solar wind early on 22 July, with speeds increasing from slightly elevated to elevated levels. Total magnetic field strength started at moderate levels, slowly easing to weak values. The north-south component started by varying moderately, but with a reduced amplitude to weak variations by the end if the period. Geomagnetic activity started Active, with one interval between 0000-0300UTC, but has otherwise been Quiet to Unsettled.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary
Solar Activity: Activity is expected to remain mainly Low, with a slight chance of Moderate activity from a number of currently inert regions on the visible disc.

Solar Wind / Geomagnetic Activity: A CME which left the Sun on 21 July is due to arrive at Earth on 23 July, with the effects of the feature likely to continue through much of the period. Otherwise a solar fast wind is expected to affect the Earth through days 1 and 2 (23 and 24 July), with the effects of this likely to decline on day 3. Geomagnetic activity is expected to be Unsettled, with some Active intervals possible at first, but with a risk of G1/Minor Storms or G2/Moderate Storms due to the onset of the CME. There is also a very slight chance of a G3/Strong Storm. A gradual decline in activity is then expected through days 2 and 3, but with some enhancements possible in any sustained periods of negative Bz.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is most likely to remain at background, with just a very slight chance of reaching S1/Minor Storm levels.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	80	20	5	1
Strong	G3	No	10	5	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	10	10	10	10
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	1	1	1	1
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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